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A MEDICAL PILGRIMAGE TO THE REPUBLIC OF PANAMA

1905

BY

SAMUEL D. RISLEY, M. D.

AND

ROLAND G. CURTIN, M. D.

PHILADELPHIA

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Author
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20°
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Chagres
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TO PORTS BETWEEN PANAMA AND GUAYAQUIL
TO GUAYAQUIL AND SOUTH
TO SAN FRANCISCO AND MEXICAN PORTS
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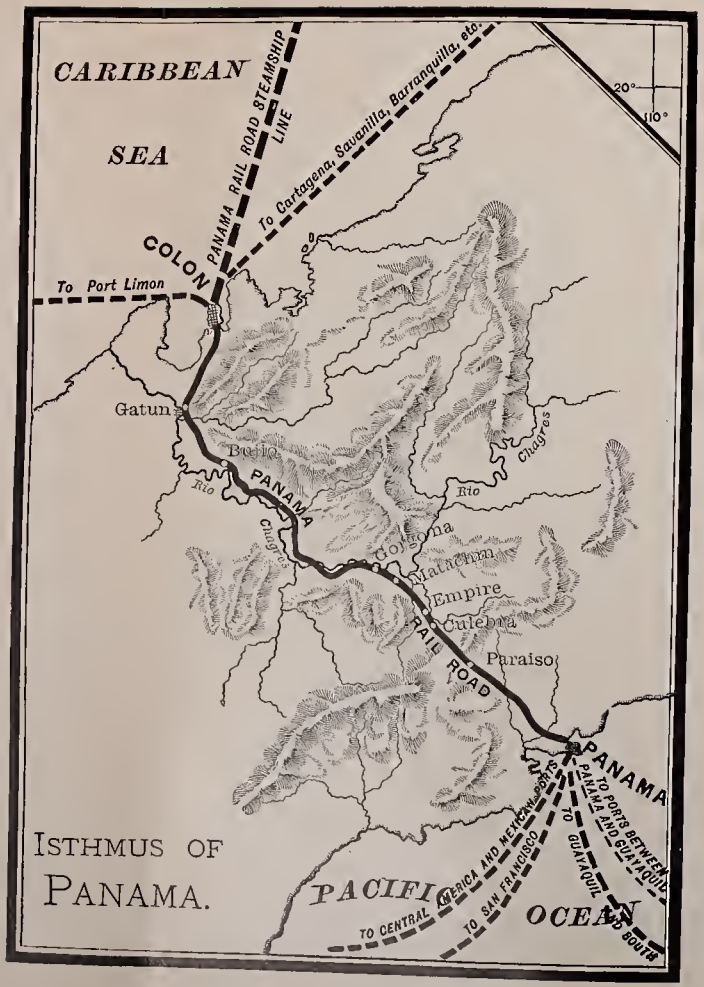
CARIBBEAN
SEA
PANAMA RAIL ROAD STEAMSHIP LINE
To Cartagena, Savanilla, Barranquilla, etc.
20°
110°
COLON
To Port Limon
Gatun
Rio Chagres
Rio Chagres
PANAMA
Culebra
RAILROAD
Paraiso
PANAMA
TO PORTS BETWEEN PANAMA AND GUAYAQUIL
TO GUAYAQUIL AND SOUTH
TO CENTRAL AMERICA AND MEXICAN PORTS
TO SAN FRANCISCO
PACIFIC OCEAN
ISTHMUS OF PANAMA.

ANCON HOSPITAL AND THE CAPITAL OF THE CANAL ZONE

This hospital is considered one of the finest in the world, both on account of its picturesque location and efficient corps of physicians

CONDITIONS IN PANAMA—REPORT OF DELEGATES TO THE FOURTH PAN-AMERICAN MEDICAL CONGRESS, AT PANAMA.

BY S. D. RISLEY AND DR. R. G. CURTIN,
OF PHILADELPHIA.

GENTLEMEN: Your Delegates to the Pan-American Medical Congress at Panama beg leave to present the following report of their personal experiences, observations and reflections. They found it no simple undertaking to travel southward 2,000 miles on a line dropped from a point on the Atlantic Coast, near the center of the North Temperate Zone, starting in the midst of a frigid winter, to encounter at the end of the journey the humid, high temperatures of the tropics; a fact which opens the question as to the wisdom of assembling a congress so near the Equator.

Leaving Philadelphia in 39° north latitude on December 26th, we reached Colon, the Atlantic Port of the Isthmus of Panama, in 9° north latitude, on January 2nd.

The route chosen was by rail to New Orleans, thence to Colon by the S. S. Beverly, a United Fruit Co. steamer which had been chartered and provisioned to carry the delegates from the United States to the Congress.

On our arrival at New Orleans we found the following pleasant company of physicians, several of whom were accompanied by their wives, assembled on the ship, but shivering in a temperature at the freezing point: Dr. Nicholas Senn of Chicago, Dr. L. Waite of Chicago, Dr. H. P. Newman of Chicago, Dr. Hale of Chicago, Dr. D. R. Brower and wife, Dr. C. Wilbur Wheeler, Dr. Palmer and wife, Dr. P. C. Coleman of Texas, Dr. Knox Bacon and wife of St. Paul, Dr. Hughes, St. Louis, Dr. Crill and wife, Dr. Emilio Martinez of Havana, Cuba; Dr. Isadore Dyer and Dr. Chassignac of New Orleans. At 1.30 P. M. on December 28th the journey down the noble Mississippi was begun, reaching the Delta after sunset. The trip down the river was enlivened by a race between the Beverly and a steamer bound for New York which,

ANCON HOSPITAL AND THE CAPITAL OF THE CANAL ZONE

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proved interesting not only from the fact that we won in the contest of speed, but in that it proved that the racing spirit of early river days was not entirely a thing of the past. From the Delta of the Mississippi the route carried us across the Gulf of Mexico, through the Straits of Yucatan and over the blue Caribbean Sea. The sail on these waters proved an interesting experience to every voyager not afflicted by seasickness, and could but stir the imagination as one recalled the strangely interesting history of the adventurous souls who first navigated them, and whose audacious valor, outrageous cruelty and greed spread a veil of romance, not alone over their own lives but over the lands they discovered and which have been dominated by them and their descendants for several centuries.

As the ship pursued her southward way, she was soon in the embrace of the perpetual trade winds, and was rocked in the trough of the sea with a pertinacity most disturbing to the comfort of landsmen who essay to "go down to the sea in ships." If the traveller left his berth sufficiently early to face the rising sun, as he stood upon the port beam of the ship, it required no stretch of the imagination to realize that he remained, held by gravity alone, upon the surface of the eastward rolling globe and was breasting, in the easterly wind, the friction and resistance of the enveloping atmosphere and shuddered lest gravity should release its hold upon him and he be left behind, suspended in planatory space.

The absence of the usual evidences of life in the sea was noteworthy. With the exception of numerous flying fish, many of which landed upon the deck during the night, a few sea gulls and the beautiful and delicate nautilus no other living thing was seen.

The very numerous examples of the mythical, dainty nautilus, with their diaphanous sails glinting with varied colors in the sunshine as they floated restlessly and buoyantly on the surface of the water, seemed the unlaid ghosts of the bold and adventurous Buccaneers, who sailed westward on the wings of the East Wind never to return.

The dawn of the fourth day found our ship at anchor in the bay of Colon. As the sun rose we had our first view of the Isthmus of Panama with its spine of undulating, verdure covered hills swathed in a blue-gray veil of mist, which softened their outlines, and screened them in mystery. This impression was

emphasized by the rising of the sun, apparently in the south. Turning to the atlas it will be seen that the trend of the isthmus is from east to west, while that of the two great continents which it both separates and connects is from north to south; that North and South America lie upon the water like a pair of huge saddle bags with the isthmus as their nexus. It is as though the Almighty, Maker of continents, careering through space on winged steed, had flung from his saddle bow, upon the bosom of the sea, a north land and a south, with all their treasure of gold and silver and more precious things, but failed,—or was it by

A Wharf at Colon.

design?—to tear them asunder, and so they remain to arrest the billowing tides, and to turn back, deflecting to the north and the south, the rivers of the Equator to warm the cold shores bathed by currents from polar seas. Why were the continents not torn apart and left, the one under the influence of the constellations of the Great Bear, and Orion with his club, the other under the mysterious power of the brilliant Southern Cross? Who can tell what would have been the course of the political history of mankind or the physical geography of the continents had the creative finger creased a pathway for the waters between the Atlantic and Pacific?

After official inspection by Dr. Perry of the U. S. Marine Hospital Service, to whom we are indebted for many courtesies, we were landed in small boats. At the wharf we were received by the President, Dr. Julio Icaza, and other officers of the Congress, all of whom met and welcomed the arriving members with the delightfully effusive courtesy so characteristic of the Latin

View of the Harbor and part of the city of Panama, from the balcony of the President's Palace.

races. The introductions over, we were escorted to the Washington Hotel, which is delightfully situated on the shore of the Bay of Colon below the major part of the city, embowered in a grove of cocoanut palms and many other varieties of tropical trees, tinted foliage shrubs and brilliant flowering plants, where we partook at 11 o'clock of the conventional Panama breakfast.

We were then supplied with transportation to Panama City where we arrived at 4.30 P. M. and were met at the station by

A typical street in Panama City.

Col. Gorgas of the U. S. Army, the efficient and gentlemanly head of the sanitary department of the Canal Zone; Dr. Carter of the Marine Hospital Service, Dr. La Garde, U. S. A., and many others interested in the entertainment and scientific work of the Congress.

Accommodations were secured at the Grand Central Hotel, a quaint old structure of the Spanish-American type of architecture. It stands facing the open cathedral plaza which is richly crowded with tropical foliage and beyond which, partially con-

De Lesseps' Buildings back of Colon.

cealed by royal palms, could be seen rising the twin yellow stone towers of the ancient Cathedral. The brief delay at Colon, the journey of forty-five miles by the famous Panama R. R., which had consumed four hours; the turmoil and contention, after the Spanish fashion, in getting quarters at the hotel; the meeting of friends who had arrived earlier, etc., were all replete with interest and novelty which left a confusing mental picture requiring many days of careful observation to dispel and classify. The hot, humid climate, the motly population, composed of Jamaican negroes, Carib Indians, Japanese, Chinese, Spanish-Americans of widely differing degree in the social scale, Europeans and the

recent acquisitions from the United States, not only as governmental employees but those who were loitering about keenly studying the changing conditions on the Isthmus with an eye to business ventures.

The strange and squalid dwellings in Colon and along the railroad, many of them mere shacks reared on piles and covered with dried grass or palm leaves; the rank vegetation; the morass over which the train sped for the first nine miles of the journey; the profusion and endless variety of trees and shrubs, all unfamiliar to the dweller in the temperate zone; the known and

Suburbs of Colon

unknown varieties of fruits and flowers which hemmed in the roadbed on either side; the glimpses now and again of the excavations for the canal and of the immense collections of abandoned French machinery:—locomotives, cars, dredges and hoisting engines, derricks and boats; all rusting and rotting in the moist heat but partially, we thought mercifully, concealed by the rank growth of vegetation which enveloped them; here and there picturesque views of the famous but dreaded Chagres River. Many congregations of vultures were seen, nature's black, silent, and solemn scavengers. Occasionally birds of brighter plumage were discovered darting away under the glint of the sunshine

and disappearing into the impenetrable mazes of the forest jungle.

Stepping from the train at some of the numerous stations parrots, gorgeous peacocks, and monkeys, held in bondage and for sale, were seen. The latter, especially, seemed strangely in harmony with a stranger's impressions of a strange environment.

The Esplanade on the old sea wall looking out upon the bay.

These simians with their pleading eyes and manifest fear; with their chattering but wordless mouths, and their wise appearing human visage, suggested to us a human soul in bondage to some strange spell of enchantment, but looking in vain for deliverance. The flowers we plucked were not fragrant, we heard no pleasing note of bird music. "It is a land of odorless flowers and songless birds!"

ENTRANCE TO ANCON HOSPITAL

Nevertheless, Dr. Nelson says: "A careless or unobservant traveller, writing on the tropics, has said: 'The birds are without song and the flowers without odor.' If ever there were a gratuitous libel it is this. The flowers within the tropics are noted for their wonderful fragrance, and it may not be known that even the orchid family, which furnishes the most wonderful of flowers, at night exhales delightful perfume. It is quite true that during the day these plants are devoid of it. As to the second allegation, that the birds are without song, I must say that that good man probably saw no other bird except the turkey buzzard."

We failed to discover the beautiful songs and fragrant odor described by Dr. Nelson, in all probability because we were engaged in the sessions and functions of the Pan-American Medical Congress in the evenings and were surrounded by other odors which were more penetrating, and the song birds perhaps do not do their singing in the month of January, or, the meeting of the Medical Congress may have had a depressing effect upon the birds.

The sole relief from the strangely depressing influence of our first experiences was afforded by witnessing the numerous groups of khaki-clad canal engineers, active, strong, busily engaged in surveying and draining the roadbed and cleaning a space on either side of the track from the rapidly growing vegetation. To merely look at them was as refreshing as a cool breeze at the close of a sultry summer day. Placed beside them the indolent, shiftless natives, white, yellow, or black, seemed a sad and sickly crew and made us feel proud of Americans in general.

The first night at the hotel at Panama served only to emphasize the depressing impressions of the journey thither. Pasted on the walls in the corridors, bedrooms and in every available space were placards from the sanitary corps advising of the necessity for sleeping under mosquito bars and of taking quinine daily. Before an hour had passed a gentleman advised us not to put our shoes on in the morning until they had been shaken to dislodge possible tarantulas and scorpions. The relative futility of the advice regarding the mosquito bars soon became apparent as the brief twilight of the tropics sank almost suddenly into night. As soon as the electric lights were turned on herds of mosquitoes filled the hotel through the unscreened doors and windows. One of the first items of news that came to us after our arrival was the sad death from yellow fever of Mrs. Seger, which had oc-

SECTIONAL VIEW OF THE PANAMA CANAL

According to present plans, ships were to be elevated at Pedro Miguel and Miraflores on the Pacific end and at Bohio on the Atlantic end, by great locks, making the level of the water between the locks as shown above and the elevations would have to be excavated to that level. The dotted line shows the line of a sea level canal, which Chief Engineer John F. Wallace seems to favor, and which would require much more excavating and entail much greater expenditure.

curred but an hour before. She was the young and accomplished wife of Genl. Davis' private secretary, who, as a bride, had come from New York to the Isthmus in November. The American colony were almost panic stricken over the occurrence, which seemed to confirm the wild stories we had heard, while still on shipboard, of the prevalence of yellow fever at Panama City. The following morning, on awakening, one of us discovered that he had been bitten and found a stegomya, well gorged, clinging to the inner side of the mosquito bar under which we had slept; a discovery not calculated to give added joy during the following five days, the incubation period for the fell disease. We found the meshes of the mosquito netting large enough to admit a full grown insect.

The experiences of the first day and night on the Isthmus form a depressing mental picture, difficult to portray in words, for it was a new, first glimpse, of human life in the tropics under altogether peculiar geographic and climatic conditions. The days which followed were, for your delegates, an opportunity to study these conditions and they have sought to unravel and explain them in their relation of cause and effect in the following detailed report.

That the conditions which have obtained on the Isthmus of Panama and the contiguous portions of Central America for several centuries are depressing cannot be truthfully denied. It is our design to show the relation which the social structure, as it has existed there, bears to the climatic conditions, and how far these relations can be modified and improved by a wise scientific application of sanitary measures, to the problems which are presented for solution.

Any adequate study of the climatology of the Isthmus involves primarily a consideration of the geography, topography and geology of that portion of Central America. The Republic of Panama is situated between approximately 7½° and 9⅔° of north latitude, the canal zone lying about 600 miles north of the Equator. While the general trend of the isthmus is from east to west, it lies like a bent bow, with its convexity to the north bathed by the Caribbean Sea, while the Bay of Panama lies in its concavity on the south. It joins Columbia on the east and Costa Rico on the west. The population of the Isthmus is 311,000 and its area is 3,157 square miles. The average width is about 70 miles, its area about two-thirds that of Pennsylvania,

and four times that of Massachusetts. The general surface is mountainous, without a definite system, but composed of irregular ranges. In the west we have the Sierra de Chivigni range, entering Panama from Costa Rico, one peak being 11,265 ft., while Pico Blanco rises to 11,740. To the east of this range lies the Sierra de Veragua range, one peak of which rises to 9,275 ft. East of this irregular range lies the Sierra de Panama range, the highest peak of which rises to 1,600 ft. This range is broken at Culebra

The great canal excavation at Culebra.

Pass where the highest altitude falls to 345 ft, and is the lowest pass in the irregular mountain ranges in Central America, except that in Nicaragua, west of the Culebra Pass, which is the only other feasible location for an interoceanic canal.

East of the Culebra Pass the mountains again gradually increase in height culminating in an elevation of 3,000 ft. above the sea. The great rainfall of this region finds expression in the numerous rivers which drain its mountainous surface, 150 in all, 50 of which empty into the Caribbean Sea and the remainder into

the Pacific. Numerous islands and islets skirt both the Atlantic and Pacific Coasts of the Isthmus of Panama, 630 lying along the former and 1,053 on the latter side. Some of them are simply low reefs and are bare, others are covered with dense forests and groves of cocoanut palms.

In regard to the topography of the Isthmus at the canal, General Abbot, of the United States Engineer Corps, says that nothing like a mountain chain, properly so called, is encountered on the line of the canal. Parts of the hills of the Isthmus were made by the action of volcanoes now extinct and portions are composed of sedimentary deposits. The rains and winds have worn down these elevations, so that the highest point on the line of the canal, at Culebra, was only three hundred and forty-five feet before the digging commenced. This is the great cut, and is about three-quarters of a mile long.

From Colon to Gatun, five miles and a half, the canal runs through low swamps, filled with alluvial deposit, forming a dense jungle land, bordered by foot hills. From Gatun to Bohio, nine miles, it follows the Chagres River valley. At Bohio, the valley closes in, and above this, the plain of Tavernilla rises to form a junction with the Continental Divide at Obispo, seven miles from Bohio. At San Pablo, where the valley is again shut in, there is formed a constriction which is the scene of freshets. From Culebra, seven miles distant from Obispo, the route of the canal follows the Rio Grande down a gradual slope to La Boca, the Pacific terminus, a distance of eight miles. A vertical cross-section of the Isthmus on the line of the canal shows a very flat anticlinal arch with the apex at Culebra.

Volcanic activity has long ceased near the Panama route, but occasional moderate earthquake shocks are felt near Panama, the echoes of remote violent disturbances. General Abbot gives a record of the earthquake shocks for five years in Panama and at San Jose, Costa Rico. At Panama, there were seven tremors, four slight shocks, and no strong shocks; at Costa Rico, forty-three tremors, nine slight shocks, and thirty-five strong shocks.

This relative frequency of seismic disturbance, showing, as has been frequently noted, that Nicaragua is situated within the volcanic zone while the Isthmus of Panama is situated beyond and to the south of its border, a fact which is of signal importance in selecting a route for the interoceanic canal. If the Nicaragua

route had been chosen the canal would have passed near Ometepa, which was in violent eruption in 1883, whereas, in the Panama route, the extensive atmospheric erosion of hills demonstrates that there has been no active volcanic eruptions for untold centuries.

In one of the ruined churches in old Panama, at least two hundred years old, is shown an arch about fifty feet wide. It is the widest and flattest arch known to architecture, being almost horizontal. The story is told that a monkish architect was helped in building it by faith and prayer. He put it up a great many times, only to have it fall down. Finally, he spent a night in

The Presidential Palace and home of President Amador, at Panama.

fasting and prayer, telling God that it was for His glory and asking for help. He then put up the arch for the last time and demonstrated his unwavering faith by boldly standing under the arch while the supporting scaffolding was removed and it still remains where all else is in ruin. This arch proves that there have been no earthquakes of any account since it was built.

The recent earthquake in Nicaragua and the eruption of Monatomba show the dangers of that region, sometimes called the "American Route," for the construction of an interoceanic canal. It is probably fortunate that the failure of the French companies and their willingness to turn their enterprise over to the United States for a stipulated sum of money led to the aban-

dotiment of Nicaragua as the site for the canal, since it lies in the earthquake belt. In December, 1904, a tremor occurred in Costa Rico, which lies north from Panama, but still south of the earthquake belt, which in conjunction with an unusually severe rain caused a landslide which either covered or carried down the

The Canal Building in Panama, in which are centered all the offices of the various departments engaged in the engineering and sanitary work of the Commission.

mountain side about twenty miles of the railroad between Porto Limon and San Jose, which interupted communication by rail for many months.

While Panama is less prone to seismic influence, nevertheless, as the unexpected often happens, it might occur on the line of the canal. If a lock-canal, should be constructed with a large dam at Bohio, it is easy to see that the locks might be rendered useless

for months, by a weakening, or destruction of the huge dam which would be required to retain the water. In deciding the form of construction, as between a tide level canal, or one with locks, it should be borne in mind that the immense body of water required to be held at a higher level, if suddenly released by the destruction of the dam, would flood a large area of country to the east, leading to the destruction of property and loss of life.

TABLE I.—OBSERVED AIR TEMPERATURE ON THE ISTHMUS.

Month	Colon, 92 months	Gamboa, 58 months	Alhajuela, 39 months	Panama, 9 months	La Boca, 41 months	Naos, 70 months	Mean	
	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°F.
January	26.25	24.10	24.96	26.17	26.20	26.60	25.71	78.28
February	26.18	23.60	26.06	26 25	26.79	26.15	25 84	78.51
March	26.47	24.15	26.55	26.62	27.25	26.33	26.23	79.21
April	26.48	24.90	27.05	27.25	27.69	27.65	26.84	80.31
May	26.73	26.85	25.55	27.07	27.01	27.90	26.85	80.33
June	26.73	27.70	26.21	26.69	27.23	28.85	27.23	81.01
July	26.77	26.75	26.02	.....	26.69	28.31	26.91	80.44
August	26.23	26.60	26.20	.....	26.10	28 00	26.63	79.93
September	26.57	27.15	25.97	.....	26.46	27.94	26.82	80.28
October	26.18	26.55	25.46	26.45	25.84	27.45	26.32	79.38
November	26.10	26.80	25.60	26.01	25.79	26.80	26.18	79.12
December	26.47	25.75	25.76	25.78	26.48	26.80	26.17	79.11
Means	26.43	25.91	25.95	26.48	26.63	27.40	26.48	79.66

TABLE II.

Localities	Approximate Latitude	Years of observation	Average temperature				Max. recorded
			Annual	Hottest month	Coldest month	Difference	
	°		°F.	°F.	°F.	°F.	°F.
Washington	39	25	54.7	76.9	33.2	43.7	104
New Orleans	30	25	68.8	82.4	53.3	29.1	99
Key West	25	21	77.5	84.4	70.5	13.9	.....
Assuan or Wadi Halfa	23	.....	80.0	94.8	64.0	30.8	119
Habana	23	10	76.8	82.4	70 3	12.1	101
San Juan, P. R.	18	12	78.8	81.5	75.7	5.8	101
Kingston, Jamaica	18	10	78.1	81.1	74.6	6.5	.....
Barbados	13	20	75.6	76.9	73.4	3.5	
Cayenne	4	1	79.7	82.0	77.1	4.9	.....
Manila	15	17	80 0	84.0	77.0	7.0	100
Isthmus of Panama	9	26	79.7	81.0	78.3	2.7	99

These tables are from "Problems of the Panama Canal," by Brig. Gen. Henry L. Abbot.

MAIN DRIVEWAY TO ANCON HOSPITAL

This naturally picturesque driveway is now being beautified by modern landscape gardening

Temperature of the Isthmus.

The temperature of the Isthmus, always the controlling factor in meterological and health conditions, while in some measure modified by the physical features of the region, as already described, is really controlled by the geographic position of the Isthmus in relation to the oceanic currents, the annually recurring solstices, and the trade winds. In point of fact, altitude is the least important factor in the meteorology of the region. The Isthmus of Panama is situated in about 9° of north latitude. As a consequence the sun at noon is in the zenith twice annually, first on the 13th of April, when it crosses the line passing to the summer solstice.

But as the sun passes northward, the gradual but progressive diminution of temperature which would naturally result is overcome by the steadily lengthening days and the consequent longer duration of solar radiation, so that the maximum temperature is, in fact, reached at the summer solstice in June, the reverse being true as the sun passes southward and crosses the 9th meridian on August 29th to its winter solstice in December.

Notwithstanding this semi-annual march of the sun back and forth across the line the variation between maximum and minimum temperature is surprisingly small. For example, reference to Table 1 shows a mean monthly maximum temperature in June, 1902, of 81.01, and a minimum of 78.28 in January of the same year.

A study of extreme maximum daily temperature on the Isthmus shows that the recorded heat is never as high as at New Orleans, Havana, or Washington, D. C. Indeed, the marked characteristic of the climate of the Isthmus is its great uniformity.

The actual results of the sun's radiation as recorded by the thermometer at different localities on the Isthmus and the extraordinary uniformity shown by the monthly observations, as set forth in the accompanying table are explicable only through the careful consideration of a number of modifying conditions. The most important of these are the oceanic currents and the direction of the prevailing winds.

Influence of Oceanic Currents and Prevailing Winds.

In any study of the climatology of the Isthmus the fact that the thermal equator, on the longitude of the Isthmus of Panama, does not coincide with the geographic equator of the globe but

lies to the north of it, approximately 8.50° or 9°, or, just to the south but very near the Isthmus of Panama; the line of highest temperature, *i. e.,* the thermal equator, being carried northward from the geographic equator by the great oceanic current which carries thither the heated equatorial waters of the Atlantic Ocean. These waters increase the temperature not only of the Isthmus of Panama but of the whole of Central America and of those portions of the United States which form the coast line of the Gulf of Mexico. That the temperature is uniformly high but never rises on the Isthmus of Panama to the extremes observed in many other localities is explained by the direction of the prevailing winds, which is controlled by the thermal equator, the semi-annual march of the sun, forward and backward between the tropics of Cancer and Capricorn, and by the rotation of the earth's surface eastward.

The winds from the south flow inward to supply the vacuum created by the rising column of heated air as the sun passes northward of the thermal line, and the prevailing winds during that period, which corresponds to the rainy season, are southerly. As the sun passes to the south to its winter solstice, for the same reason the winds become northerly; but, owing to the rotation of the earth the direction of the winds is diagonal to the Equator. Northeasterly winds, therefore, prevail during the dry season, from December to April, and southeasterly from April to December, the wet season.

It follows, therefore, the geographic trend of the Isthmus being east and west, that it is traversed through its long axis by these perpetual trade winds which are filled to the point of saturation by rapid evaporation from the heated waters of the Equator carried northward by the great ocean currents.

As a consequence the Isthmus is constantly enveloped in a canopy of aqueous vapor, which regulates the temperature, by rendering latent the sun's energy by day, and by preventing radiation from the earth's surface during the night. The temperatures recorded are, therefore, never as high as in more arid regions and never fall as low; these peculiar atmospheric conditions accounting for the extraordinarily equable mean monthly temperatures.

Rainfall.

These peculiar conditions, furthermore, explain the extraordinary rainfall of the Isthmus, while the direction of the winds

in relation to its geographic position account for the peculiarities of its distribution. It is obvious (from consulting Table 3) that but a slight fall in temperature is all that is needed to precipitate in rainfall the water contained in an atmosphere laden to the point of saturation. The annual rainfall is 140 inches at Bohio on the Atlantic side, where the land begins to rise for the Continental Divide, at Culebra, it being on the side whence come the prevailing winds, the actual precipitation in a single year having reached 200 inches; while in the interior it is 93 inches and on the Pacific side 60 inches. When we compare this rainfall with that of New Orleans, which is about 27 inches, and with Washington, D. C., which is 24.10 inches, the great difference is apparent. A fact of signal, practical importance in the construction of the canal is the variation in the rainfall at different seasons of the year. For example, there is a well defined dry or so-called winter season extending through four months, from the middle of December to the middle of April, the following eight months constituting the rainy or summer season.

TABLE III.—CONSOLIDATED RECORDS OF RAINFALL IN INCHES.

Month	Atlantic		Interior Stations					Pacific Coast			
	Colon	Bohio	Alhajuela	Gamboa	Gorgona	Bas Obispo	Culebra	Panama	Taboga	Isle Naos	La Boca
No. of years	(33)	(7)	(4)	(21)	(3)	(10)	(5)	(4)	(7)	(3)	(5)
January	4.0	9.0	1.3	2 4	3.3	1.8	0.9	0.7	0.5	0.2	2.1
February	1.4	1.8	0.3	0.7	0.6	0.4	0 2	0.7	0.1	0 0	0.1
March	1.6	2.3	0.7	0.9	1.2	0.8	0.3	1.6	0 4	0 0	1.9
April	4.2	5.3	4.9	3.5	2.4	2.7	2.0	2.8	1.7	0.8	4 0
May	12.1	13 3	11 7	10.9	11.6	10 9	12 0	7.6	4.8	6.3	9.2
June	13.4	12.6	12.3	9.6	9 3	11 7	10.2	7.9	5.5	8.2	7 1
July	16.7	17.1	14.7	10 3	13.3	8.8	7.6	7.6	4 3	6.2	9.5
August	15.1	19 2	12.9	12.7	14.2	9.8	8.9	6.8	4.8	7.1	7.2
September	12.6	16.6	11.8	10.9	13 5	12.2	9 1	7.5	7.4	7.3	6.7
October	14.0	18.0	14.9	13 1	11.2	10.5	11.7	9.5	6.6	7.3	9.9
November	20.9	20.3	16.1	12.2	10.4	10.6	11.3	11.6	6.3	4 1	10.1
December	12.3	10.6	7.5	7.0	5.5	9.1	11.2	2 8	3.2	6.6	5.6
Year	128.3	146 1	109.1	94.2	96.4	89.3	85.3	66.8	45 5	54 0	73 4

We arrived, January 2nd, in the midst of the dry season but it was not, however, so very dry, for we counted five showers on the day of our arrival and it rained every day while we were on the Isthmus. These showers were of short duration, however, falling from light, fleecy clouds and coming on quite unexpectedly.

Humidity.

A study of the relative humidity, during the dry and wet months, made at Colon by the Old Canal Co. (1881) and by the U. S. Weather Bureau (1898-99) shows 80 per cent for the four dry months, 87 per cent in six of the rainy months and 83 per cent in the intermediate months of December and May. The humidity is excesive, therefore, over the entire Isthmus, the actual amount of moisture in the air on the two coasts and in the interior following closely the amount of rainfall in these respective localities, the absolute humidity being actually less by night than by day.

View from the doctors' quarters at Ancon Hospital.

When we compare this relative humidity with that of Philadelphia, which averages about 69 per cent, and Denver, Colorado, which is 40 per cent, we can then realize the great amount of moisture in the atmosphere on the Isthmus.

Climate.

It follows from these considerations that the climate of the Isthmus of Panama is essentially tropical but that in consequence of its geographic position, its topography and relation to the trade winds and ocean currents, it is in many respects peculiar, even when compared with the West Indies, for example. The great rainfall, the persistent and uniform high temperature and

high percentage of humidity, especially in the relatively low belt of the canal zone, render it, not only an extremely undesirable place of residence, but explains many of the difficulties which are encountered in the construction of the canal. The perpetual summer gives ample time, while the humid air, the rapid decay of vegetable matter and the fertile, rain soaked earth furnish all the requirements for a rapid and riotous growth of all vegetable life.

The highlands are covered with a dense growth of towering trees, their tops being bathed in sunlight, while their roots are in everlasting shade and are buried in an impenetrable tangle of shrubs and vines. The valleys are water courses which, when flooded by tropical rains, spread over the low lands amid the tangle of vegetable life, forming extended morasses. When the waters temporarily subside these swamps are left festering and fermenting in the hot sunshine and become the birthplace of herds of pestiferous insect life, and seething caldrons from which eminate noxious gases to poison the air.

Dark as this picture seems at first sight to the casual visitor, a deeper penetration, and more careful study of all the conditions, serve to lighten the background and to show that life on the Isthmus of Panama is not necessarily nearly so hopeless as it seems to the stranger. It should be borne in mind that the pure air of the trade winds from the Caribbean which carry over the Isthmus the water which makes these conditions possible, at the same time neutralize in large measure the resulting noxious atmospheric influences. With these winds to aid, all else that is needed, indeed, to convert the Republic of Panama into a modern Garden of Eden is the application of sanitary science and the wisely applied industry of man, protected by an honest and stable government. At the present time there are many beautiful homes, surrounded by fertile plantations, situated on the hillsides in the more salubrious localities, cooled by the sweeping trade winds, which traverse their broad verandas. The travelling guest from the temperate zone, as he gazes from their elevation over the picturesque beauties of the tropical scene, and realizes that the glories of nature exhibited to his view are never interrupted by the winter's sleep, is charmed by the paradise-like surroundings. The uncontrolled forces of nature have heretofore, however, for the most part maintained the ascendancy and have not only vanquished and held in subjection the aborigines of Central

America, but also the early adventurous European settlers and their descendants. By virtue of its peculiar geographic relation to the highways of commerce, it has been singularly subjected to danger from infection by all infected ports with which it was in communication, and in turn has become the distributing center for tropical diseases to the seaports of the world. From the time of the adventurous Buccaneers, to the present day, but especially since the construction of the Panama Railroad, the Isthmus of Panama has been the highway of commerce between

Dead Man's Island, Panama Bay, where eighty officers and sailors of the U. S. S. Jamestown were buried in 1858, victims of yellow fever. Under the jurisdiction of the United States.

the oceans but in especially close and frequent communication with all of the ports of South America, the West Indies and the southern ports of the United States and Mexico. It is, therefore, not only in constant danger from infection by yellow fever, plague, smallpox and other diseases, but becomes itself a menace to the commercial ports of the world.

Health Conditions.

Any historical study of the health conditions of this region presents an appalling picture. The decimating of the ranks of the

early explorers and the Buccaneers by disease, has been repeated again and again in the experience of those who have ventured for any reason to exploit this narow neck of land between the oceans. Perhaps the most signal demonstration of the noxious character of its climate was afforded by the laying of the Panama Railroad from 1848 to 1855. It has been said that there was a dead coolie for every tie used in its construction. While it is doubtless true that the accounts of the deaths attending that enterprise have been greatly exaggerated, nevertheless, Mr. Tracy Robinson, a native of New York, who has lived at Colon for 40 years, told us that there had been 1,200 deaths out of a total of 6,000 men employed. He stated also that at the City of Colon there had never been a marked epidemic of yellow fever, a fact probably due to its having a population immune to that disease and that the easterly winds from the sea make of Colon a relatively salubrious locality. The experience of the consulates and other European officials located at Panama City has nevertheless been a sad one, as shown by the records kept in the Foreign Cemetery since 1826. Many of them with members of their families are buried there, victims for the most part of yellow fever. In one case, both husband and wife succumbed to the disease in a single week and their immediate successors speedily followed them to a grave in a foreign land. The Isthmus of Panama has indeed been styled "the grave of the European."

As to the health of the Isthmus, up to the present time, we quote at length from General Abbot as follows:

"The health question during construction is one of the important elements of the canal problem. While no one will claim that the climate of the Isthmus is salubrious, it is certain that much wild exaggeration has been circulated, in great part founded on the experience of ill-acclimated laborers engaged in excavating surface soil for the railroad or for the canal.

"The health statistics during the construction of the Panama Railroad have never been made public, but are well known to have been appalling. At that date it was not understood that natives of the temperate regions cannot safely perform arduous manual labor under exposure to a tropical sun, and that dependence for such work must be placed upon the negroes of the West Indies. White men can supervise, but must not attempt more. Fortunately, the health records during the canal operations (and especially those during the operations of the new company, which

should furnish the best guide in view of the great changes in the physical condition of the region) have been preserved, and are shown in Table 18, contributed by Dr. Lacroisade, for many years (since 1887) the medical director of the company hospital near Panama. He is thoroughly familiar with the Isthmian conditions, and the notes following the table are a translation from a letter written by him on March 9, 1902, and published in

The Marine Barracks at Empire.

The Medical News, vol. 80, p. 707, New York, 1902. His views on this important subject are entitled to the highest confidence. He attributes the marked improvement, shown in Table 18, to the better accommodations of the laborers, to better drainage, and especially to the fact that the excavations have reached a level below the poisonous emanations of decaying organic matter. The period of serious sickness incident to excavation in tropical regions has apparently already been passed at Panama. It is interesting to note that whereas the percentage of disease and of

ONE OF THE WARDS OF ANCON HOSPITAL

mortality for general ailments have remained sensibly unchanged during these successive epochs, they have fallen enormously in the later years for disease due to the local climate.

"1898.—Among the employees of the company there was no sickness of an epidemic character; the sanitary conditions were satisfactory.

"On the Isthmus generally, a light epidemic of influenza prevailed during the months of January and February, but no yellow fever or other sickness of an epidemic form appeared.

"1899.—Among the employees of the company there was a single case of yellow fever, contracted at La Boca in November, by a Frenchman recently arrived and employed on the harbor works. He recovered. There was no other sickness of an epidemic form among the employees of the company, and the sanitary condition was satisfactory.

"In the City of Panama, between May and the middle of December, there were about 139 cases of yellow fever. Its victims were chiefly foreign sailors, arriving in the bay, and Columbian soldiers from the interior.

"In June and July a rather severe epidemic of influenza occurred. In September a short epidemic of measles caused some deaths. The City of Colon appeared to be proof against yellow fever.

"1900.—Among the employees of the company a single case of yellow fever occurred, terminating in recovery, and there was no other sickness of an epidemic form. The sanitary condition was satisfactory, notwithstanding the rather high death rate caused by a larger number than usual of deaths from chronic diseases of a general type.

"On the Isthmus, generally, yellow fever, which had disappeared after the middle of December, returned in March. Between that date and September 10th, about 138 cases occurred in Panama, of which 128 were among the Columbian soldiers from the interior. There was no other sickness of an epidemic form. The City of Colon escaped yellow fever.

"1901.—No epidemic appeared among the employees of the company, and the sanitary condition was very satisfactory.

"On the Isthmus generally, yellow fever, of which no case had been reported since September 10, 1900, was again imported in January, 1901, by a priest and a sister of charity coming from Buenaventura. It was communicated to a sister of the orphan

asylum of the Central Hospital, and then to the superior. The latter alone recovered. These four were the only cases in January, 1901; and since then up to the present month (March, 1902,) there has been no return of the disease.

"In April, 1901, a serious epidemic of smallpox appeared in Panama and still continues. The employees of the company have suffered very little, a result which should be attributed to the numerous vaccinations which have been made.

"The City of Colon appears always to have escaped these epidemics.

"*General Conclusions.*—Considering the average figures for the last four years, I find that with a personnel of 2,275, the percentage of disease has been 29.65; and the mortality, 2.35 per cent. These figures do not exceed those on large works in any country.

"It should, however, be added that this personnel has been long on the Isthmus and is well acclimated; I may even say extremely so, since 91 per cent of the total death rate is due to chronic organic diseases common to all countries, leaving only 9 per cent of it chargeable to the diseases of the local climate.

"The classified employees, which constitute about 8 per cent of the entire force, are represented in the total death rate by 5.70 per cent, while the laborers are represented by 94.30 per cent. The mortality in the latter class is therefore the greater.

"Among the infectious diseases on the Isthmus, yellow fever is undoubtedly the most to be feared by unacclimated persons of the white race. During the two recent epidemics of yellow fever the first from May to December 15, 1899, and the second from March to September 10, 1900—only two cases appeared among the personnel of the company. Both were French, one a workman on the wharf of La Boca, who had been only a few days in the country; and the other the head nurse of the company's hospital, who had held this position for two years. To these should be added the superior or sisters of the hospital, attacked in January, 1901, after three or four months of residence, one of the four solitary cases of this month just mentioned. These three cases recovered. I attribute the last two cases to infection proceeding from the foreign hospital, which received a large number of the 261 cases occurring in the different epidemics; and which, by its too close proximity, is a menace to the hospital of the company. The latter offers satisfactory sanitary conditions.

"I have mentioned in former reports the disappearance of yellow fever from the Isthmus, from the year 1892 to the year 1897. This would lead to the belief that that disease is in no wise necessarily epidemic. In 1897, indeed, between the beginning of March and the beginning of August, there were about 70 cases, as well at Panama as on a portion of the line of the canal; but no case occurred at Colon.

"I will remark that the City of Colon, which up to about the years 1891-2, was a location than which nothing could be better for yellow fever—reputed more dangerous than the City of Panama—has since that time remained free from any infectious disease and has escaped the yellow fever epidemics of 1897, 1899 and 1900. This is evidently due to the sanitary works which have been executed, the filling up of the many little swamps and the cleaning of streets, which before were veritable sewers. By these improvements, the City of Colon has been considerably freed from the swarms of mosquitoes which rendered life insupportable.

"Might not a like result be secured for the City of Panama (1) by a good supply of water; (2) by drains to conduct sewage to the sea, to which its situation and conformation are easily adapted; and (3) by watering the streets daily in the dry season, and by cleaning them daily throughout the entire year. Now they are in a repulsive condition of filth. These three improvements, which I consider fundamental and essential, are now wholly neglected. There should also be instituted an effective quarantine service for vessels arriving in the harbor, for beyond all doubt the epidemics of 1897, 1899, 1900, and a few cases which occurred in January, 1901, were due to importations, in one instance from the Atlantic and in three instances from the Pacific.

"I do not expect by these measures to remove completely from Panama its character as a terrain favorable for the propagation of yellow fever; but certainly, if thoroughly applied, they would exclude some epidemics and render a residence on the Isthmus less dangerous for unacclimated persons of the white race.

"The important works executed from one end to the other of the line of the canal have also done much to improve the sanitary conditions on the Isthmus."

The prevalent diseases of the Isthmus, are yellow fever, malaria in its violent forms, beri-beri, smallpox, measles and dysentery. A case of supposed bubonic plague died in Panama City in 1905 which caused a great scare because of the fruitful

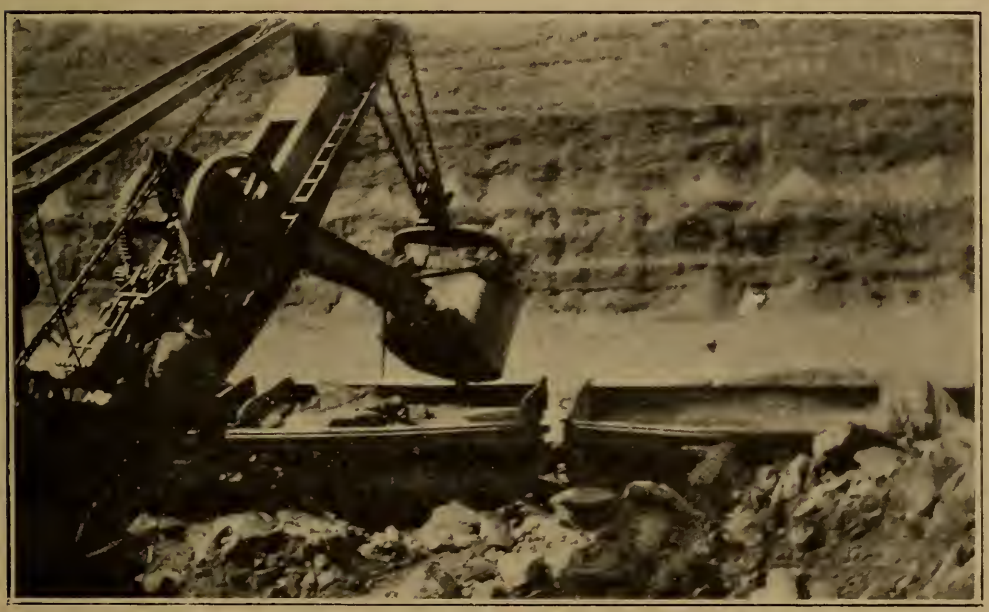
soil afforded by Panama for its rapid spread, under conditions which would menace the commercial ports of the world. The present population of Panama City, Colon and the canal zone is 39,684, but the time is at hand when the population of the Isthmus is being rapidly reinforced by non-immunes to yellow fever and other tropical diseases. It would be natural, therefore, to expect a higher percentage of disease and death. It is probable, however, that yellow fever and malaria especially, will abate under the strict quarantine regulations against South American and West Indian ports which is now being enforced, and the skillful and scientific sanitary measures conducted by the officers of the U. S. Army, for unquestionably the two great causes of disease, excepting malaria alone, on the Isthmus, if we excluded climatic conditions, are commerce and filth.

TABLE III.—OFFICIAL HEALTH STATISTICS OF THE PANAMA CANAL

Years	Effective force employed	Percentage of disease			Percentage of mortality		
		Diseases of Europe	Diseases due to climate	Total	Diseases of Europe	Diseases of climate	Total
Old company:							
1881	928	21 02	42 03	63.04	1.94	4.74	6.68
1882	1,910	18.85	47 64	66.49	3.21	4.39	6.60
1883	6,267	23.24	42.62	65 86	3.20	4.46	6.66
1884	17,615	27.58	36.95	64.57	2.58	4 08	6.66
1885	15,215	11.93	49.14	61.07	1.73	3.79	5.52
1886	14,935	14.01	43.88	57.89	1.67	3.43	5.10
1887	16,217	21.83	39 25	61.07	3.22	3.99	6.21
1888	13,725	12.17	40.46	52.63	1.81	2.54	4.35
Mean	10,854	18.83	42.75	62.58	3.05	3.92	5.97
Receiver:							
1889	1,826	.....	.....	.....	.....	.....	.....
1890	about 800	.....	.....	.....	.....	.....	.....
1891		.....	.....	.....	.....	.....	.....
1892		.....	.....	.....	.....	.....	.....
1893		.....	.....	.....	.....	.....	.....
1894		.....	.....	.....	.....	.....	.....
Mean	971	.....	.....	49.68	.....	.....	2.88
New company:							
1895	1,225	.....	.....	49.95	2.05	0.89	2.94
1896	3,715	.....	.....	39.91	2.08	0.84	2.92
1897	3,980	.....	.....	51.85	1.99	1.00	2.99
1898	3,400	28.26	13.65	41.91	1.76	0.27	2.03
1899	2,500	19.76	5.84	25.60	2.24	0.12	2 36
1900	2,000	17.05	8.50	25.55	3.00	0.25	3.25
1901	2,000	18.60	6.85	25.45	1.55	0.20	1.75
Mean	2,703	20.92	8.71	37.17	2.10	0.51	2.61

Such back yards we had never before seen. They were filled with bottles and the refuse of the kitchen, the foliage of the rank vegetation, excrement, and dish water which had been accumulating for many years. In one case coming under our notice such a compost heap was removed only far enough from the house to allow the door to be opened half way.

Malaria is probaly not more common on the Isthmus than it is in some localities in the United States; but in Panama it is an all-year-round disease. In his report for the month of November,



Steam shovel at work.

1904, Dr. Gorgas states that at Bohio the blood of 44 school-children was examined, the malarial organism being found in 29 cases. Six grains of quinine a day was given to each of these 29 children for fourteen days, and their blood was then re-examined. The blood of but five was then found to give a positive reaction.

In Dr. Gorgas' report of the 106 deaths that occurred in Panama City during the month of November, only 89 of which were attributable to the city, it is stated that the death rate had decreased 19 from the month of October, 1904. We were surprised to read that beri-beri had caused ten deaths—the greatest

number due to any one disease. Dr. Stern, of Panama City informed us that this disease is always quite prevalent there, and is the cause of many, if not most, of the deaths. Nine deaths are recorded as having been caused by colic, eight by tuberculosis, eight by fever, and seven by bronchitis. Only one death is attributed to dysentery. President Amador, who is a physician, and Dr. Stern, who has practiced many years at Panama, both informed us that dysentery has never been what might be called epidemic, although it is usually present in Panama City and on the Isthmus. We heard of but one case of smallpox during our stay on the Isthmus, and this was taken from a ship at Colon hailing from a South American port while we were in that city.

Sanitation on the Isthmus.

Yellow fever on the Isthmus is generally a very malignant disease. Dr. Nelson states that of forty-one cases admitted to the Charity Hospital in Panama City in 1880 not one recovered. The destruction of mosquitoes and preventing their propagation by proper drainage, etc., are the great safeguards against both the yellow fever and malaria. Dr. Gorgas and his faithful corps of assistants who are directing the sanitary work are fighting these diseases along the line laid down by the investigations of Doctors Read and Finley and their colleagues, and used so successfully by Dr. Gorgas, in Cuba, viz.: that the mosquito is the sole propagating cause. Cases are removed to the hospital at once; are carefully protected by mosquito netting both in transit and after being placed in the hospital, and the houses from which they were taken are thoroughly cleansed and fumigated. Sanitation is, indeed, the great problem which confronts the authorities on the Isthmus. The work is Herculean in proportion, but if the doctors are given proper authority and opportunity, we feel sure that, while victory may be delayed, they will in the end succeed. At present the canal employees are panicky, especially the Americans, and are retained with difficulty.

Some are homesick, others are frightened, but with improved health conditions, more opportunities for amusement, more comfortable quarters, and more inviting food and lower cost of living they will be more contented and many of the existing difficulties will disappear.

The energetic work of the engineers in draining Colon and the line of the railroad and canal, under the direction of the

sanitary officers removes the rank growth of vegetation and the pools of stagnant water, thus preventing the propagation of mosquitoes while the new pure water supply of Panama City permits, not only the removal of rain barrels and other recptacles, now the sole source of supply, but admits of the thorough washing of the city. Colon and Panama are the two largest cities, and although not included in the Canal Zone are located within its limits. The United States has, however, control of both these cities so far as sanitary and quarantine regulations,

Laborers' Barracks left by the French Company.

water supply and drainage are concerned. In point of fact, the sanitary problems are much less intricate than were those at Havana, where Dr. Gorgas and his assistants so successfully labored; but we must remember that in Cuba there was a water supply piped to the city at the time that the U. S. Army took hold of the problem. There was also an attempt at a sewerage system, although this was inadequate. In Panama managed on that account. When the necessary changes—such as a rigid quarantine, a proper water supply, underground drainage, the removal of swamps and stagnant water, and the establishing of adequate hospital facilities—have been completed, the great menace to health at Panama will be almost entirely removed. Much work in the way of draining the swamps and

the ditches containing stagnant water that are found along the railroad and around the towns has already been accomplished. The filthy back yards have been cleaned; covered barrels for refuse have been furnished; cisterns have been covered; cesspools have been cleansed; and water that has been standing two days has been properly oiled, to prevent the propagation of the mosquito. We were satisfied that the Sanitary Bureau is well managed and in most excellent hands. All that is wanted is to let the work go on without hindrance. Science will then assert itself, and Panama will be regenerated. Even after that, however, there will be danger from the extensive commerce with

Thatched huts of natives of Panama. A large part of the rural population lives in such habitations.

the West Indies and with South America, which will always be liable to introduce tropical and contagious diseases from the Atlantic and Pacific Oceans. This danger will be incurred later on, when the unacclimated and non-immune population has been greatly increased, as it will be when the work on the canal is fully under way.

To the visiting medical man the great canal hospital at Ancon, reared by the French at the enormous cost of $5,600,000, is a feature of great interest. While the hospital is commodious and the grounds elaborate and beautiful, these enormous figures nevertheless show how little the French owners got in return for their money. In this connection we were informed that the

NATIVE VILLAGE AT PARAISO (PARADISE)

Paraiso is on the Canal Zone. Here the Houses are constructed entirely of the palm tree, and there are no chimneys, as all the cooking is done on charcoal braziers

ANCON HOSPITAL

One of the roads

hospital and ambulances at Colon cost $1,400,000, and the sanatorium on the Island at Toboga was reared at a cost of $465,000.

The Ancon hospital is situated on a hillside just out of the City of Panama on a beautiful site overlooking the harbor and Bay of Panama. It is erected on the pavilion plan, about forty buildings in all, one story in height with ample windows, wide doors and tiled roofs. The entrance driveway is lined by rows on either side with magnificent royal palms, from sixty to seventy

Part of the barracks at Empire.

feet in height behind which are located officers' quarters, and the bacteriological laboratories, where experts are busily engaged in further and extensive investigations of the mosquito theory of yellow fever, malaria, etc., and the examination of the blood. The general appearance of the hospital grounds suggest a park and exhibit the highest art of the landscape gardener applied under the favoring conditions of the tropics.

Strange to say, a supply of fresh water was neglected, so that rain water is used; and there is no system of drainage, but these defects are soon to be remedied. Yellow fever patients, covered by mosquito netting are carried to the wards through the main entrance and in front of the doors of the officers' quarters; a fact which demonstrates the deep conviction these medical men entertain of the truth of their teaching regarding the propagation of this disease by mosquitoes. The patient is then carried to the yellow fever pavilion, the beds in which are surrounded by wire

netting ten feet high, eight feet wide and twelve feet long. The nurses are all from the United States. The temperature at Ancon is cooler than in the city, the elevation being greater, and is therefore fanned by the breezes from the sea and mountains.

The discomforts of life on the Isthmus are greatly enhanced by the insect life of the jungle and also by those which infest the highlands everywhere in infinite numbers and in great variety. On leaving the city one encounters the red bug which burrows under the skin and lays it eggs which produce an irritation felt nightly for several weeks even after leaving the tropics.

Town of Toboga on Toboga Island.

In addition to these are the grass louse, the chigre, the wood ticks, or *garrapatas,* and the flies. These insects, together with the mosquito, conspire to render one's nights miserable after a tramp through the woods or grass.

The Island of Toboga belonging to the Republic of Panama is situated ten miles from the city, in the Pacific Ocean. It is the summer and health resort of the Isthmus; many wealthy citizens having their summer residences there. The town of Toboga, located on the northern slope of the island and stretching down to the sandy beach, is a picturesque and beautiful resort, embowered in tropical trees.

Before leaving the Isthmus we were given a Panama breakfast on board an excursion steamer while traversing the Bay of Panama and skirting the shores of this beautiful island, lying as it does in the Pacific Ocean. President Amador and his charming wife accompanied the party. The island is ten miles from Panama, is twelve miles in circumference. Its sides are abrupt, rising at one place to a height of 935 feet. It is a veritable garden spot, where are grown pineapples, bananas, and cocoanuts, said to be the best to be found in the world. It possesses many mineral springs of iron and magnesium. We were informed that the inhabitants of the island lose their teeth early, owing to the iron in the water. This seems to indicate that the water is markedly acid. The island has a colony of lepers, and the rest of the population are largely fruit-growers and cottagers. It is far enough away from the lowland of the coast to be free from mosquitoes and other swamp influences. Having an ocean, rather than a seaside climate, it forms a convenient place where malarial patients and hospital convalescents can be sent to recuperate. Malarial patients are quickly cured by a sojourn there; and persons with lung diseases are sent there from the whole Isthmus, in many cases with benefit. It is the health resort of the Isthmus.

Colon is a town of over 5,000 inhabitants, situated on an island of coral formation. Its principal buildings are the Washington Hotel, Canal Hospital and an English Church reared and maintained by the Panama Railroad from funds contributed through the efforts of an English lady who, while visiting the Isthmus, recognized the great need of such an edifice. The City of Colon, although dirty, is not so indiscribably filthy as it was six months ago. There is no underground drainage or pure water, the water that the people drink coming from cisterns connected with the roofs of the houses. These roofs are usually covered with vultures, birds not very unlike our Southern red-headed turkey-buzzard, but smaller. citiznes. The cisterns, we were told, are cleaned out about once in every two years, when one or two inches of solid sediment is usually found and removed; but a successful business man of Colon informed me that his cisterns had not been cleansed for ten years. He said, however, that the water was pure and contained no "wiggle-waggles" (meaning larvæ). We then suggested that the water might be too deadly to support life.

Colon is near the mouth of the Chagres River, which, we are

convinced, is not the deadly stream that it was once supposed to be. It is true that it is very malarious; but unacclimated persons that have for six months lived along its banks do not, as yet, seem to have been influenced by it. A supposed healthful outing for the citizens of Colon is to go to Gatun and float down in canoes to the mouth of the Chagres River, a distance of about seven miles.

We were told that the Isthmus is occasionally visited by mild cold spells, called "northers," during which, with a cloudy sky, a damp northwest wind blows for two or three days. This is followed by a fall of temperature in the daytime to about 79°. This so-called coldness lasts for about one day. There are sometimes storms, and even cyclones, in the middle of the rainy season. We were informed that the rainy months are also the malarial period, but that the disease is not wholly confined to that season.

It will be seen from the foregoing statements and official reports that there is but little justification for the current exaggerated stories told by homesick laborers, disgruntled adventurers, frightened travellers and bombastic literary heroes.

To show what tales are told now, even on the Isthmus, when we landed at Colon we were informed that there had been ten cases of yellow fever in that city, that there were then twenty-four cases of the disease in the hospital at Panama City. We were assured by the medical officers in charge, however, that there had been but ten cases in all at Panama City since the United States took charge of the Canal Zone. On our return to Colon, while waiting for the steamer, a gentleman who did not know that we were physicians, informed us that the Pan-American Medical Congress had broken up in a panic because of the great prevalence of yellow fever, which was not true.

Among the homesick and frightened Americans that have lately gone to the Isthmus the wildest stories are circulated; and these are not only credited by them while there, but repeated after reaching the United States. The statistics of the United States marines stationed at Empire, on Culebra Hill, show that, up to the time of our visit, there had not been a single death from local diseases among the four hundred marines; and that the percentage of those in the hospital was not larger than would be found at the average post in the United States. It must, however, be borne in mind, that these soldiers live at one of the most

salubrious spots on the Isthmus, are restricted to their camp, and compelled to live regular lives.

In Dr. Gorgas's report of the 106 deaths that occurred in Panama City during the month of November, only 89 of which were attributed to the city, it is stated that the death-rate had decreased 19 from the month of October, 1904. We were surprised to read that beri-beri had caused ten deaths—the greatest number due to any one disease. Dr. Stern, of Panama City, informed us that this disease is always quite prevalent there, and is the cause of many, if not most, of the deaths. Nine deaths are recorded as having been caused by colic, eight by tuberculosis, eight by fever, and seven by bronchitis. Only one death is attributed to dysentery. President Amador, who is a physician, and Dr. Stern, who has practised many years at Panama, both informed us that dysentery had never been what might be called epidemic, although it is usually present in Panama City and on the Isthmus. We heard of but one case of smallpox during our stay on the Isthmus, and this was taken from a ship at Colon while we were in that city.

The importance of simple and prudent living in Panama, as in all tropical countries, cannot be too strongly stated. The following rules were laid down for the government of persons living in the tropics and which have been largely followed by the educated natives: (1) A quiet, regular life without the use of alcoholic stimulants. (2) Rise early, bathe, and take coffee and rolls. (3) Breakfast at 11 A. M., on ripe fruits, coffee, beefsteak or chops and potatoes. (4) Avoid the sun and active exercise as far as possible at midday. (5) Dinner at about 6 P. M., simple in character. (6) An evening without fatigue or dissipation, and the avoidance by ladies of décolleté dressing. (7) Retire early and sleep under mosquito bars. (8) Take four grains of quinine daily upon retiring. The observance of these rules is especially important to all strangers and unacclimated persons, since it gives strength to resist disease. Had they been carefully and persistently observed many lives would have been saved. Dr. Nelson in his work recommends teetotalism as a safeguard. He states moreover, "Keep out of the tropics if you can; should necessity force you within them, avoid all forms of alcohol, that you may spend your later days in peace and comfort."

We were repeatedly told that many of the canal employees needlessly sacrificed themselves by leading profligate and licen-

tious lives, drinking intoxicants, gambling late into the night, thereby diminishing their power of resisting disease.

The above rules for living are especially important to laborers. The laborers resident in the tropics know well from experience the wisdom of avoiding the midday heat and therefore quit work in the middle of the day. Then, too, it should be borne in mind that the heat experienced by these laborers is greater than that indicated by the observations recorded in the tables, where the thermometrical readings are taken in the shade with all glare excluded, whereas the laborer is exposed to the direct rays of the sun reinforced by the reflected rays, where the temperature is many degrees higher. Many are in the excavations, entirely cut off from all breezes; but, strange to say, sunstroke and heat exhaustion are rare among the workmen.

To the climatologist it is of interest to consider the logical influence of such a climate as we have described over the habits and character of the natives, since man is in some measure the creature of his environment. The dweller in Panama never experiences the invigorating cool breezes of more northern climes, but is constantly subjected to the continuous, moist tropical heat, which causes depression and lassitude. This, together with the ease with which their bodily wants can be supplied, tends to make of them an indolent, unambitious people. In a word they have no winter season against the rigors of which they must provide, in advance, a supply of food, fuel and clothing. In the north temperate zone, the marked changes of seasons,—seed-time, harvest and the long, frigid winter,—determine the habits and regulate the life of the people. Their recurring needs lead to forethought and frugality. Fruition is contingent upon endeavor. In the Republic of Panama nature has done her utmost. Perpetual summer means continuous fruitage and harvest. Everything is provided to meet the actual physical necessities of mankind. In the north, hunger, gaunt of form and forbidding, stalks grimly beside the ploughman, dwells in the cabin of indolence and poverty, and sits at the loom of compelling industry. In Panama, hunger has been forever banished, since beneficent nature has cast her richest benefactions even into the lap of indolence. The lazy dweller under the warm, humid air eats and lies down to sleep; awakens and stretches forth the hand to pluck and eat again. The banana and orange; the bread fruit and yam; the khaki and the custard apple, together with many other wholesome and nutritious

foods grow in wild profusion at the very door of the shack in which he lives and drowsily dreams away the centuries.

Such an environment can but have an enervating and deleterious influence over the physical, mental and moral nature of mankind. It is doubtless true that very much that is otherwise inexplicable in the political history and in some features of the social life of equatorial regions may find their *reson d'tre* in the climatic conditions which have been described.

In conversation with a prominent clergyman, a graduate of a famous English university and a resident of Panama for thirteen years, he made the statement that about 86 per cent of his parishioners, composed of a native mongrel population were living out of wedlock, but that as a rule they were faithful to their mating. Dr. Nelson, in his book, "Five Years in Panama," confirms this state of affairs and gives as a reason for it, that the native women, knowing the vagrant character of their mates, realize that they can be held more certainly by simple mating, since in wedlock the union would prove a serfdom from which they could not so readily escape in the event of the husband proving unfaithful or brutal. This is a social condition probably without parallel in the temperate zone.

It is inconceivable that any satisfactory and enduring form of government, having as its basis just trial by jury and an incorruptible judiciary, could ever grow out of such a soil or be reared and maintained upon a social substratum born in such a morass. If it is indeed true that the unstable conditions which our government found in existence in the Canal Zone and contiguous regions, were the result in some measure of the influence of climatic conditions over the life and character of the residents there, then it is obviously wise that the first endeavor should be to remove or modify as far as possible the depressing influences of the region not only over the physical health of the people, but to provide for the elevation of their social condition.

Pan-American Medical Congress.

The Congress has become largely a Spanish-American body. The first meeting, held in Washington, D.C., in 1893, had between one and two thousand delegates. Since that time, covering a period of twelve years, it has met in Spanish speaking countries and the number of delegates in attendance has progressively decreased, until at the Panama meeting there were approximately

but one hundred present, forty of whom were from the United States, twenty-two of them ariving at the close of the Congress, having been delayed en route by the slowness of their vessel.

More and more of the papers presented are in Spanish, a fact which makes the Congress less attractive to the English speaking delegates and, we think unfortuately, the next, the fifth, Congress is to be held in Guatemala, Central America. As will be seen from the foregoing, the interest is rapidly waning in all parts of America, since, although the meetings have been held for the past twelve years in tropical countries they have not been largely attended by members of the profession resident there.

We think that it is important for the future success of the Pan-American Congress that it should meet at least alternately in the North, either at Washington, in some Canadian city or at New Orleans, in order to maintain the interest of the English speaking delegates. The only general discussion in English awakened in the Congress was on yellow fever, its etiology and sanitation. A paper on the subject by Dr. Finley was read by Dr. Emilio Martinez of Havana. The paper was a strong presentation of the theory which claims that the mosquito is the sole factor in the propagation of the disease and was discussed at great length by Drs. Gorgas, Carter and others. Some of the participants, while accepting the mosquito as an important factor in the spread of yellow fever, were not willing to accept it as the sole agent in the propagation of the disease.

The social features of the Congress left nothing to be desired. The visiting members were most hospitably and elaborately entertained, receiving during their stay on the Isthmus nothing but kindness and courtesy at the hands of the entertainment committee, the U. S. Sanitary officials, the government of the Republic of Panama, the medical practitioners and the citizens generally. We are particularly indebted to Dr. Gorgas, who introduced us to the chief official in the Bureau of Statistics, who very kindly placed at our disposal elaborate statictics on climate, health, disease, etc., collected under his supervision by the French Canal Commission, and aided us in our search through them for the data we desired.

At the close of the Congress we returned to Colon to await the sailing of the homeward bound steamer. While there we had an opportunity to witness the practical application of one of the methods of the Sanitary Bureau. Two hours before sailing, after

SHIPPING BANANAS AT GATUN

From Gatun, on the canal, bananas are shipped to Colon, where they are reshipped to the United States

Public wash house, Port Limon; stalls rented to washerwomen.

Zent River, Costa Rica. Terminus of the railroad.

our luggage had been packed but before it was removed from the rooms we had occupied, men came with pans and brooms and burned a regulation quantity of pyrethrum powder in the closed apartments and then carefully shook out the mosquito bars and bedding, swept the floors and burned the sweepings. The motive was to destroy any mosquito which might have feasted upon us, as we had so recently come from the infected City of Panama.

At 7.30 P. M., January 10th, we began our homeward journey on the Preston, one of the extensive fleet of the United Fruit

Zent River, Costa Rica.

Company, but sailing under the flag of Sweden. Indeed, we saw no ship in those waters bearing the Stars and Stripes except the ships of our navy. At 2 P. M. on the 11th, after a tempestuous voyage, we reached Port Limon, Costa Rica, where we remained until 3 P. M., January 14th, while the ship was taking her cargo of bananas for New Orleans. The three days delay, however, proved a most delightful experience. Port Limon is a well kept, clean city, with an abundant and pure water supply, secured through the able and rigid management of the United Fruit Company. We had the opportunity to visit the large and commodious new hospital located there and reared by the Fruit Company,

where every facility has been secured for the isolation and treatment of yellow fever and malarial patients, or those afflicted by other forms of disease. While in Costa Rica we were the guests of the Fruit Company, who entertained us hospitably. An interesting and instructive experience was an excursion by rail to their extensive banana plantations on the picturesque and beautiful Zent River, twenty-nine miles inland from Port Limon, where they gave us an elaborate breakfast. Their plantations there cover an area of thirteen miles square. A trip by rail to the City of San Jose, called the Paris of Central America, was to have been an interesting part of our pilgrimage, but was rendered impossible by an extensive landslide which had carried approximately twenty miles of the railroad from the mountain side into the valley below.

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